DEVICE FOR DISPENSING AND APPLYING LENGTHS OF ADHESIVE TAPE

The present invention relates to devices for applying to a surface a section of tape from a roll of pressure-sensitive, heat-sensitive, or pressure-heat-sensitive tape.

Devices such as are shown in U.S. Pat. No. 3,455,769 are effective in making tape applications for many purposes but are not adapted for use where the tape-applying feed block must travel a substantial distance or where the amount of force that can be applied to carry the feed block into its tape-applying position must be limited. The reason for the latter limitation is that dispensers in accordance with said patent require that cutting and tape-unwinding be effected as part of the stroke bringing the feed block into a tape-applying position and the stroke is, additionally, opposed by return springs.

The principle objective of the present invention is to provide dispensers that will be free of the above referred-to limitations, an objective attained by providing a dispensing device in which the operations of turning the feed block and cutting the tape thereon are both divorced from the movement of the carriage for the feed block from its first into its second or tape section-applying position, both operations desirably being effected on the return of the carriage from its second into its first positions.

Another objective of the present invention is to provide for adjustments in the length of the stroke of the carriage.

Other objectives of the invention are to provide a dispenser in which the rate of travel of the carriage or its force, or both, in either or both directions of its travel can be adjusted.

Another objective of the invention is to provide devices in which tape rolls of larger size can be used and yet another objective is to provide devices in which tapes of the type having an interliner can be used with the interliner removed as such a roll is unwound during use.

In the accompanying drawings there are shown embodiments of the invention illustrative of these and other of its objectives, novel features, and advantages.

In the drawing:

FIG. 1 is a side view of a device, in accordance with the invention, for applying tape sections;

FIG. 2 is a fragmentary and partly sectioned side view thereof on an increase in scale;

FIG. 3 is a fragmentary front end view of the apparatus;

FIG. 4 is a fragmentary, vertical section, on an increase in scale, taken approximately along the indicated lines 4—4 of FIG. 1;

FIG. 5 is a front view of the apparatus with the feed block in a tape section-applying position;

FIG. 6 is a fragmentary and partly sectioned side view of the apparatus with the feed block in said position;

FIG. 7 is a perspective view of the feed block on a further increase in scale;

FIG. 8 is a like view of one of the side plates of the feed block carriage showing one of the pressure feet;

FIG. 9 is a side view of apparatus in accordance with another embodiment of the invention;

FIG. 10 is a fragmentary side view of apparatus in accordance with yet another embodiment of the invention;

FIG. 11 is a section, on an increase in scale, taken approximately along the indicated lines 11—11 of FIG. 10;

FIG. 12 is a section taken approximately along the indicated lines 12—12 of FIG. 11;

FIG. 13 is a face view of a tape roll and its supporting hub;

FIG. 14 is a like view but with the roll supported by the hub;

FIG. 15 is a section taken approximately along the indicated lines 15—15 of FIG. 14;

FIG. 16 is a partly sectioned and somewhat schematic view illustrating an embodiment of the invention in which the carriage is lowered by means of a spring and raised by fluid under pressure;

FIG. 17 is a like view of another embodiment in which the carriage is raised by a spring and lowered by means of fluid under pressure;

FIG. 18 is a view of yet another embodiment in which the carriage is raised by a spring and moved into its second position by electrically powered means; and

FIG. 19 is a like view of another embodiment of the invention in which the carriage is lowered by a spring and returned to its first position by electrically operated means.

In the embodiment of the invention illustrated by FIGS. 1–8, a support 20 includes a base 21 and is cut away to provide an entrance 22 enabling the work to be positioned on the base 21 in the path of the carriage 23, the path including a cushion 24 embedded in the base 21. The support 20 has an inturned flange 25 extending along its upper and rear edges.

Brackets 26 in support of the cylinder 27 of a double-acting, air-operated unit generally indicated at 28 are secured to the support 20 by bolts 29 extending through vertically disposed slots 30 thus to position the stem 31 of the unit 28 perpendicular to the base 21 and to permit the position of the cylinder 27 to be varied relative thereto. At the upper end of the stem 31 there is a split clamping ring 32 whose ends are joined by a clamping screw 33 enabling the ring 32 to be moved upwardly and downwardly on the stem 31 and locked in any desired position. The bottom face of the ring 32 carries a cushioning member 34. By these or equivalent means, the downward travel of the stem 31 may be accurately limited.

A transverse arm 35 in support of a tape guide roll 36 is fixed on the upper end of the stem and provided with antifriction inserts 37, of nylon, for example, see FIGS. 5 and 6, in engagement with the support 20 thus to prevent the stem 31 from turning.

The carriage 23 is fixed on the lower end of the stem 31 and a sleeve 38 on the stem 31 and butted against the carriage 23 carries a cushioning member 39. The carriage 23 has axles 40, 41, and 42 as may best be seen in FIGS. 2, 6, and 7. The axle 40 rotatably supports a feed block 43, shown as rectangular, with its corners establishing transverse, linear cutting edges. Pins 44 project laterally from the sides of the block 43, one pin at each corner thereof. The axle 41 is provided with a tape guide roller 45 and the axle 42 has a yieldable backing 46 and is provided with a rotatable anvil 47.

The lower bracket 25 has a depending arm 48 having a central, downwardly opening slot 49. Pawl members 50 are interconnected as at 51 and each is pivotally connected to the arm 48 by a pivot pin 52 which also serves to support within the slot 49 a coil spring 53 whose ends are caught on the arm 48 and on the interconnection 51 thus to yieldably maintain the forked pawl ends 54 in a pin-engaging position with the upper ends of the pawl members 50 in engagement with stops 55 with which the arm 48 is provided.

From the foregoing, it will be appreciated that when the stem 31 is moved downwardly from its upper, first position, the opposition to such movement is only the slight resistance of the spring 53 as the pawl members 50 are forced away from their movable position by the uppermost proximate pins 44 as the carriage 23 is lowered and the resistance of the tape as it unwinds. The minimum downward movement of the stem 31, is, accordingly, that necessary to bring such uppermost pins 44 into a position below the forked pawl ends 54 for engagement therewith on the return of the carriage 23 into its first position while its maximum stroke depends only on the maximum stroke the power operated unit 28 provides.

On the return stroke, the pawl members 50, when engaged by the then operatively positioned pins 44 cause the feed block 43 to turn a quarter turn, in a counter clockwise direction as seen in FIGS. 1, 2, and 6. Rotation of the feed block 43 in the other direction is prevented by means of a yieldably resilient latch 56 engageable by and holding a pin 44 thus to prevent such turning.

The support 20 is also provided with a hub 57 in support of the core 58 of a roll of tape 59. The hub 57 and core 58 are shown as of the type fully disclosed in my copending application Ser. No. 798,852, filed Jan. 9, 1969. The support 20 is also provided with a tape guide roller 60.